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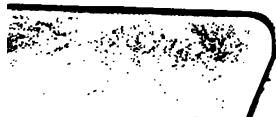
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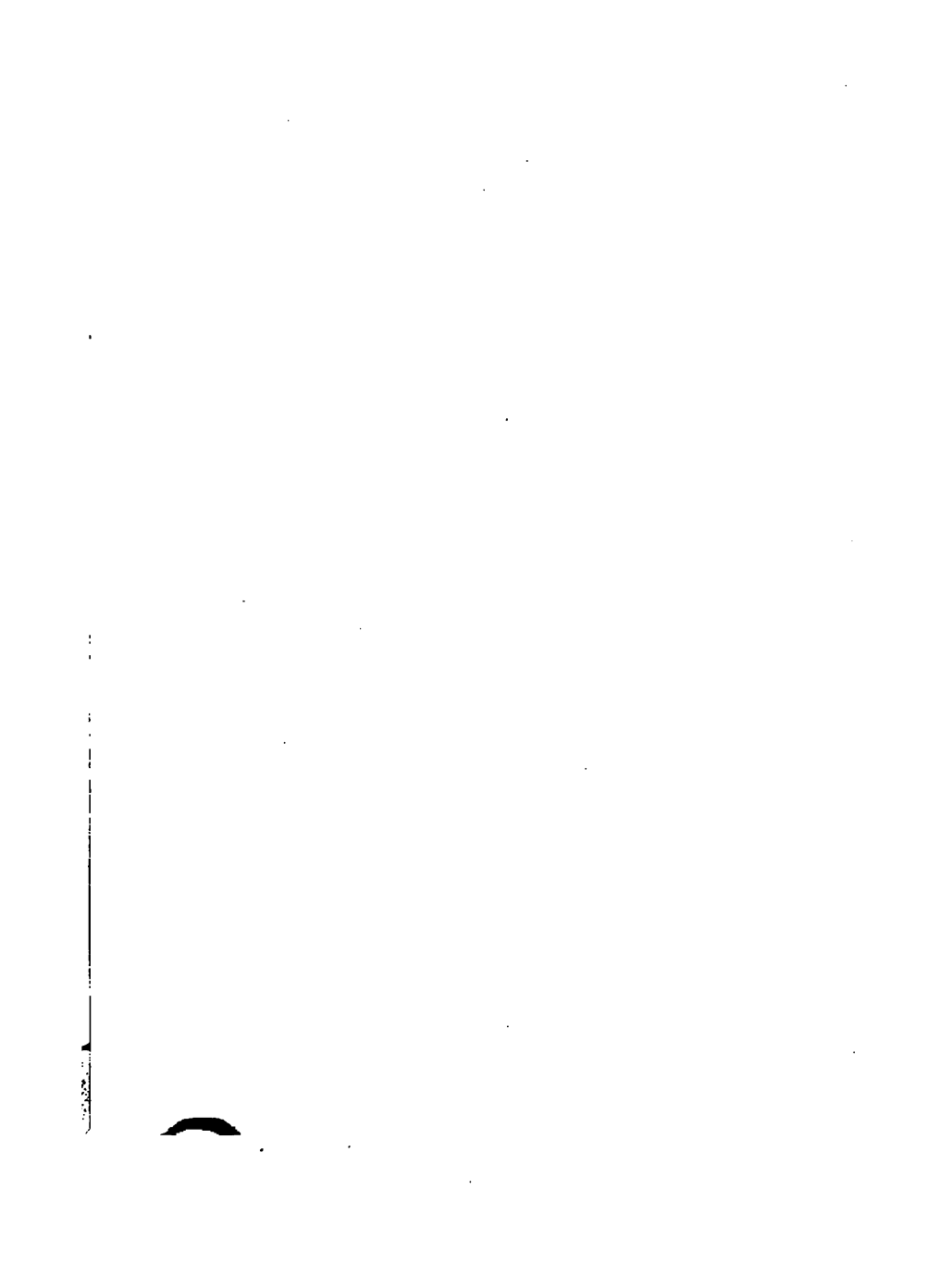
H.J. TURRELL



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# A MANUAL OF LOGIC

## RIVINGTONS.

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# A MANUAL OF LOGIC

OR A

*STATEMENT AND EXPLANATION OF THE  
LAWS OF FORMAL THOUGHT*

By HENRY J. TURRELL, M.A. OXON



RIVINGTONS

London, Oxford, and Cambridge

1870

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## Preface

THE object of this Manual is to give a concise and accurate statement of the laws of Formal Thought.

The Author has been engaged in private tuition in the University of Oxford during the last sixteen years, and has attempted in this treatise to supply a want which he has for some time felt.

65 HIGH STREET, OXFORD,  
*October 1870.*



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## ERRATA.

- In p. 28, ch. vii. § 2, line 5, *for* "convertible" *read* "simply convertible."
- In p. 78, § 3, *for* "must be distributed in the conclusion, and must therefore be universal," *read* "must be distributed in the conclusion, and must therefore be distributed in the major premiss, which must therefore be universal."
- In p. 101, *for* "Probable reasoning admits of no degrees" *read* "Probable reasoning admits of degrees."
- In p. 102, § 1, *for* συλλογισμός ἐξ εἰκότων ἢ σημείων, *read* συλλογισμός ἐξ εἰκότων ἢ σημείων; *for* εἶκος *read* εἰκός.





## Chapter I

*Definition of Science—Two Kinds of Logic—The Object of this Treatise*

MANY facts may have been observed and remembered. Prior to their arrangement, and the discovery of the law which explains them, Science does not exist. Science therefore is *methodized knowledge*.

Scientific thought may be engaged on external or mental phenomena, and we accordingly have the Sciences divided into Physical and Mental. Logic, of course, is a Mental Science. Of what part of man's mental constitution does it seek to investigate the laws? Mental phenomena include the Emotions, the Will, and the Intellect. Logic is exclusively concerned with the latter. Logic may occupy itself with examining the different processes by which a knowledge of mental or material phenomena has been obtained in order to provide rules or methods of investigation, and so to make the road to knowledge easier and more certain. We thus have Inductive Logic, which may be defined the Science of the methods of Rational Discovery. This kind of Logic is concerned with thought as a product, and not with the thinking process.

There is however a Logic quite distinct and separate from this. Logic, instead of seeking to ascertain the methods by which we can most easily persuade Nature or Mind to reveal their secrets, may concern itself solely with the thinking process, and seek to ascertain the laws and condition of Right Thinking. We call this Science Formal Logic, because from it are excluded all those mental operations which do not take a distinct and definite shape, and which do not become Concepts, Propositions, or Syllogisms. We call it Universal Logic, because it investigates those laws which must regulate all thought, whatever be the special subject on which it is employed.

We thus have two distinct and separate branches of Logic, and it is important, as their object is so very different, that we should state concerning which we are about to treat.

Our subject is Formal or Universal Logic. We are not concerned with investigating those Methods of Discovery by which things make themselves *scientifically* known, but with ascertaining the laws which regulate formal thought, and we therefore define Logic, that mental Science which states the laws and explains the process of formal thought.

## Chapter II

*Explanation of Conception—Concept—Abstract Notion—Judgment—  
Proposition—Ratiocination—Syllogism—Simple Notion—Complex  
Notion—Term—Subject—Predicate—Categorematic Words—Syncate-  
gorematic Words*

THE mental acts or operations, whose laws it is the province of Logic to investigate, are three—Conception, Judgment, and Ratiocination.

(2.) Conception or Simple Apprehension is that mental act by which we embrace in one common representation the various attributes characteristic of a multitude of objects.

(3.) Concept or General Notion is the product of Conception, and is a mental representation of many objects by means of their common properties. Man, animal, house, triangle, are concepts or general notions. All concepts afford but an imperfect representation of the objects they denote, because they throw out of view all their distinctive characteristics.

(4.) An abstract notion is the mental representation of an attribute existing in one or more objects, as *light, darkness, sweetness, mercy, truth.*

(5.) Judgment is that mental act by which two notions or things are compared together, and a decision is pronounced on their agreement or disagreement.

(6.) The product of Judgment is a proposition by which we pronounce on the agreement or disagreement of two notions.

(7.) Ratiocination or reasoning is that mental process by which from two connected judgments we infer a third.

(8.) Syllogism is reasoning expressed in words—All men are mortal. All mathematicians are men. All mathematicians are mortal.

(9.) All truths which are known immediately are known by intuition. All truths which are known in consequence of their connection with and their dependence on other truths are known by inference.

( $\alpha$ ) By Perception, I learn that snow is white, and by Sensation, I know that fire is hot. Sensation therefore expresses that change in the mental state which is produced by an impression made on the organs of sense. Perception is the source of the knowledge we obtain, by means of our sensations, of the qualities of matter. No cognizance of points of agreement or difference is made by the faculties of Sensation or Perception. ( $\beta$ ) By memory, I recall my past experiences, and by imagination, I reproduce them in new and analogous forms.

(10.) Notions are either simple or complex. They are simple when they are not connected with any other notion, they are complex when they are connected with *other notions*. Notions when they form the subjects or

---

predicates of propositions are called Terms. The subject of a proposition is that about which we speak, the predicate is that which we say of the subject. All words that can by themselves form the subject or predicate of a proposition are called Simple Terms or Categorematic Words. Words or combinations of words, not able by themselves to form a subject or predicate, are called Syncategorematic words.

## Chapter III

### *On the Fundamental Laws of Thought*

THE fundamental laws of Thought are:

(1.) The principle of Identity—All A is A. This is the fundamental law of all definition and logical affirmation. If b, c, d are the constituent characters of A, we must, in affirming A, affirm b, c, d.

(2.) The law of Contradiction. Whatever is contradictory is unthinkable. Nothing can contain *contradictory* attributes. No A can be not-A. Nothing can at the same time possess an attribute and not possess it.

(3.) The law of Excluded Middle. Of two contradictory notions which cannot both co-exist we must think either the one or the other as existing, as every A must be b or not b.

## Chapter IV

### *On the Copula*

THE Logical verb is the Copula, *i.e.* "is" or "is not" "are" or "are not." It simply expresses either affirmation or denial. It does not express existence or the notion of time or of identity or equality. When we say, Centaurus est monstrum, we do not mean to imply that the centaur really exists. When we say that A is B, meaning either that  $A = B$ , or that A is the same as B, the test of conversion will shew us that the assertion of identity or equality is contained in the predicate and not in the copula. When we say, Senex non erit puer, we easily perceive by reducing the proposition to Logical form (*i.e.* to Senex non est futurus puer) that the notion of time is attached to the predicate. There are some propositions where the word "is" or "*is not*" discharges at the same time the function of predicate as well as that of copula, as "*I am*," "Troja fuit," "Simeon is not," "Joseph is not." These propositions are abbreviated forms of "I am existing," "Troja est aliquid quod existerat," Simeon is not living, Joseph is not living.

(2.) In some propositions both the copula and pre-



dicare are understood as in *Nemo omnibus horis sapit*, which, when reduced to logical form, becomes *Nemo qui omnibus horis sapit est existens*.

(3.) Every act of Logical judgment must be expressed by three Logical words—the subject, the predicate, and the copula. The number of grammatical words in a proposition is a mere accident of language. *Regit*, *monet*, *audit*, respectively express an act of logical judgment, and are resolvable into (1) *Ille est regens*, (2) *Ille est monens*, (3) *Ille est audiens*. On the other hand, any number of grammatical words may combine to form either the subject or predicate.

## Chapter V

### *On the Different Kinds of Notions*

NOTIONS may be divided on six different principles. The first division is into Singular, Abstract, Common, and Concrete.

Every notion must denote either a single object, or must express a single attribute existing in one or many objects, or must denote many objects possessing the same attribute or attributes.

(A.) A Singular Notion is either (*a*) the Singular Proper, or (*β*) the Singular Collective.

(*a*) A Singular Proper Notion is *one* that denotes an individual object, as Smith, Plato, Peter, this man, that dog.

(*β*) A Singular Collective Notion denotes a group of individuals, but not each separate member of the group—as, the Houses of Parliament, the 14th Regiment, the University of Oxford.

All these terms can be predicated of a multitude of individuals taken *jointly*, but cannot be predicated of them *severally*.

(B.) An Abstract Notion expresses an attribute, as justice, mercy, light.

(C.) A Common Notion denotes a class, and every and each individual of the class. Every Concept or Common Term can be predicated of all and each of the members which it denotes.

Every Common Notion is a Concrete Notion.

(D.) A Concrete Notion is one that denotes individual objects and connotes attributes.

Man, triangle, horse, are common and therefore concrete notions. Man denotes Socrates, Plato, Smith, &c. It connotes the attributes of animality and rationality. A notion is denotative in reference to the subjects of whom it may be said, and is connotative in reference to the attributes it implies.

#### Second Division.

Notions again may be divided into notions expressing repugnant attributes and notions not expressing repugnant attributes. Agreeing notions (or Convenientia) are those which imply attributes that can be said of one and the same thing at one and the same time. We may say of a man that he is honest, just, and godly.

Notions expressing repugnant attributes (Repugnantia) are either ( $\alpha$ ) contradictory, which are of such a kind that one or other of them can be said of every subject, but both can be said of no subject. The presence of the one implies the absence of the other, and the *absence of the one* implies the presence of the other.

Man not man, just not just, good not good, are contradictory notions.

Or ( $\beta$ ) Contrary Notions which are of such a kind that of no subject can both be said, but there are many subjects of which neither the one nor the other can be said. Just, unjust, wise, foolish, are respectively contrary notions. The presence of the one implies the absence of the other, but the absence of the one does *not* imply the presence of the other.

#### Third Division.

A notion is said to be a Positive Notion when it denotes a thing possessed by a subject, as a learned man, a wise man. A Privative Notion is one which expresses the absence of a thing from a subject which is capable of having it, as an unwise man, an unlearned man. A notion is called Negative when it denotes the absence of a thing from a subject incapable of having it, as a lifeless corpse.

#### Fourth Division.

Words expressing notions may have (1) only one meaning, and that one meaning equally applicable to all the things they denote. They are then called Univocal words; or (2) one and the same word may express many different notions, as bull, page, ounce. Such words are Equivocal or Homonymous words; or (3) a word may have one meaning but with different

applications or modifications of its meaning may be said of many different things. Words of this kind are called Analogous. Sting, fall, foot, belong to this class. We talk of the sting of a wasp, and also of the stings of conscience, of a fall from a window and of a fall in the price of bread.

#### Fifth Division.

Notions may be divided into notions *not* implying other notions, and notions implying other notions. A notion not implying another notion is called an Absolute notion. A notion which implies and necessarily suggests some other notion is a Relative notion. The notion which it implies is called its Correlative. Son implies its correlative Father. Husband implies its correlative Wife. Subject suggests its correlative Ruler.

#### Sixth Division.

*Words* must or must not express mental operations connected with Logic.

All words expressive of common ordinary notions, as dog, cat, mouse, are words of the First Intention.

All words expressing Logical relations or mental operations connected with Logic, are words of the Second Intention. Syllogism, species, genus, conversion, are *words* of the Second Intention. When my attention is *first directed* to any object, I immediately refer it to the

class with which it is in the main points identical, and I name it accordingly. All words therefore expressing ordinary notions are called Nouns of the First Intention.

To determine the logical relation of one notion to another, or of one proposition to another proposition, is a further and second application of my attention to it. All words therefore expressing logical relations or mental operations connected with Logic are Nouns of the Second Intention.

## Chapter VI

### *On Abstraction and Generalization—On the Extension and Comprehension of Concepts*

OUR knowledge begins with the Individual and the Singular. We see and observe many individuals before we form the general notion. Our earliest acquaintance is with the individual persons and things that are about us. Our mental development is becoming matured when we arrange and classify and name the different persons and objects that are presented to us.

(2.) Concepts or General Notions are formed out of Singular or Individual Notions by Abstraction and Generalization. By Abstraction and Generalization we also form the more universal notions out of the more comprehensive or less general notions.

(3.) By Abstraction I draw off my attention from all those qualities in which the things or notions observed differ and fix it exclusively on those qualities in which they agree.

(4.) By Generalization, I combine in one mental representation the facts or phenomena I observe, and *give them* a common name expressing all those attributes which they have in common.

(5.) All Generalization presupposes Abstraction. I cannot combine in one common representation many different objects, unless I attend *exclusively* to the attributes which they have in common.

(6.) Abstraction does not imply Generalization. I may observe many objects or one single object, and may fix my attention exclusively on one single attribute in the object or objects observed. I should thus employ Abstraction but not Generalization. I observe Aristides and fix my attention on his integrity. I observe an army and fix my attention exclusively on the valour of the soldiers. I thus form the Abstract Notion.

(7.) Every General Notion or Concept denotes objects and connotes or comprehends attributes. The denotation or extension of a Concept is always in an inverse ratio to its Comprehension or Connotation. Take the classes, Tiger, brute, animal, organized existence. If we arrange them in the order of their extension, we arrange them thus—(1) organized existence, (2) animal, (3) brute, (4) tiger. If we arrange them according to their comprehension, we arrange them in the inverse order.



## Chapter VII

*On the Reciprocal relation of Concepts—On Aristotle's Predicables—On Genus, Species, Differentia, Proprium, Accident—On the Summum and Subaltern Genus—On Subaltern and Infima Species—On the different meanings of the word "Whole"*

THE first part of Logic treats of notions. Notions however would be very imperfectly considered, if we omitted to treat of their definition and division. The definition and division of Concepts presupposes a knowledge of the reciprocal relation of Concepts. This subject is generally discussed in logical treatises under the head of Predicables.

(2.) Aristotle bases his enumeration of the different relations in which one concept must stand to another concept, on the different relations which a given predicate may bear to a given subject. Every predicate, he says, must be either convertible with its subject or not convertible; and if convertible, it must or must not express the whole essence of the subject. If it expresses the whole essence of the subject it is Definition, if it is convertible, but does *not* express the whole essence, it is *Property*. If it is not convertible, it either expresses

part of the essence or does not. In the former case it is Genus, in the latter Accident.

(3.) Aristotle enumerates only four Predicables. He dispenses with the express consideration of Differentia, as being of the nature of Genus. It is clear that Differentia is allied to the Genus from the fact that the same attribute may often change places. Defining man as rational animal, animal is the genus and rational is the differentia when we regard man in his relation to the brutes, but if we regard him in his relation to the angels the reverse is the case, animal becomes the differentia and rational becomes the genus.

(4.) If we adopt Aristotle's treatment of the reciprocal relation of Concepts we ought to postpone the consideration of it till we treat of Proposition. We propose to discuss the question on different principles, and so to avoid trespassing on what it belongs to the province of the Second Part of Logic to consider.

(5.) Many Concepts have no relation to one another because no part of the one coincides with any part of the other. Thus horse, house, syllogism, book, are notions which have nothing in common.

(6.) There are Concepts between which we can trace a relation. The relation which any Concept bears to another Concept will be Species, or Genus, or Differentia, or Property or Accident.

(7.) Any Concept regarded as denoting a class, and comprehending the sum total of the attributes of that

class, is a species, and the sum total of its attributes is its *essence*. The higher or more extensive class of which it is a member, and all the attributes of which it comprehends, is the GENUS. The attribute which is its special characteristic, and which distinguishes it from all other species of the same Genus, is its *Differentia*. The attributes between which and the species a connection can be traced are the *Properties*. *Accidents* are those attributes which always or sometimes accompany the species, but of whose connection with the species no reason can be assigned.

(8.) The predicables may therefore be defined.

( $\alpha$ ) Species, any concept regarded as containing the sum total of the attributes of a class, and therefore resolvable into Genus and *Differentia*. Let us regard man as the species, animal will be the genus and rational will be the *differentia*. Let triangle be the species and then figure will be the genus, and having three sides will be the *differentia*.

( $\beta$ ) Genus is that concept which can be said of many species, and which expresses those attributes which are common to the members of the different species. Thus, animal can be said of man, horses, sheep, &c., and expresses all those attributes which the members of those different species have in common. Figure again is a genus in reference to triangles, circles, squares, and may therefore be said of all triangles, circles, and squares, and *connotes those attributes which they have in common*.

( $\gamma$ ) Differentia is that attribute of a species which distinguishes it from all other species of the same genus. Rational distinguishes man from all other animals. Having three sides distinguishes triangle from all other figures.

( $\delta$ ) Property is that attribute between which and the species a connection is traceable. The property or properties may be connected, as effect with cause, or as conclusion with premisses. The properties of man are his ability to communicate his thoughts, to be a member of a social society, to engage in commercial dealings with his fellow creatures. The property of a triangle is its having all its angles equal to two right angles.

( $\epsilon$ ) Accidents are either ( $\alpha$ ) Inseparable or ( $\beta$ ) Separable.

( $\alpha$ ) Inseparable accidents are those attributes which always accompany the species, but of whose connection with the species the reason cannot be assigned.

( $\beta$ ) Separable accidents are those attributes which are not universal to the species. They belong to some members of the species but *not* to all. Learned, wise, intelligent, are separable accidents of man.

(9.) The distinction into Genus and Species is of course merely a relative distinction. Man regarded in reference to animal is a species, but in reference to soldiers, sailors, &c., is a genus. Every notion which is regarded as having other classes under it is, so far as it is thus regarded, a genus. Any notion which has only individuals

under it is a species. It is in *fact* impossible to reach an infima or lowest species, for we can always conceive some differentia by which any concept can be divided.

(10.) The most universal notion, τὸ ὄν, being, existence, as being unable to be subordinated to any other notion, is Summum Genus. It may be predicated universally of every species but cannot be a subject to any species.

(11.) Every Notion but Summum Genus is capable of being regarded as included and comprehended in some higher notion. In so far as it is so regarded it is a *Species*. Animal when viewed in reference to *organized* existence is a species.

(12.) A Genus is therefore Summum or Subalternum. A Genus Summum is that Genus which cannot become a Species, a Genus subalternum is that Genus which can become a species.

(13.) A Species is either Subalterna or Infima. A Species Subalterna is that species which can become a Genus, an Infima is that which cannot become a Genus. (We may imagine an infima species, but we cannot mention any class notion which would not admit of a differentia being added to it and so being divided.)

(14.) Every subaltern species can become a Subaltern genus, and *vice versa*. All concepts are subaltern genera when viewed in reference to the more comprehensive concept below them, and subaltern species when regarded in reference to the more extensive concept above them.

(15.) *Whenever* of any Concept the Genus or Differ-

---

entia, or both, is predicated, the proposition is Verbal or Analytical. The proposition is Synthetical or Real, when of any Concept the property or accident is predicated.

(16.) The word Whole is used in the following senses.

( $\alpha$ ) A logical whole is a whole of Predication or Extension. Every Genus is a logical whole because it denotes many species and can therefore be said of them.

( $\beta$ ) A formal whole or metaphysical whole is a whole of comprehension. Every species is a whole of comprehension because it connotes or comprehends the sum total of the attributes, *i.e.* it includes both the Genus and Differentia.

( $\gamma$ ) A physical whole is one that is tangible and visible, and is made up of separable parts. A plant is a physical whole; the root, stem, leaves and blossom, are the parts.

## Chapter VIII

### *On Logical Division and Logical Definition*

LOGICAL Division gives the extension of a Concept. Logical Definition gives the comprehension of a Concept. Therefore only Concepts having extension can be divided, and only Concepts having comprehension can be defined. No Infima Species, as having no extension, can be divided, and Summum Genus, as having no comprehension, is incapable of being defined.

(2.) Division is the opposite process to Abstraction. For Abstraction excludes differences, but Division is performed by adding on the differences, and so forming the subordinate species. Definition is the opposite process to Generalization. For by Generalization we combine in one mental representation the different parts of the essence, and so form the Logical Whole, but by Definition we enumerate separately the different parts of the essence, and so break up the Logical Whole.

## Chapter IX

*On Logical Division—On the rules of Logical Division—On Physical Division—On Division by Dichotomy*

LOGICAL Division gives the extension of a Concept. It therefore enumerates the species of a given Genus. The logical division of animal is into men and brutes, of organized existence into plants and animals.

There are four rules of Logical Division.

*First Rule.*—Let the membra dividantia equal the divisum. Dividing vertebrate animals into fishes, reptiles, quadrupeds and birds, would be a violation of this rule, because man, though included in the divisum, has not been enumerated among the membra dividantia.

(2.) The principle with which we commence the division must be steadily kept in view and preserved throughout the process. We may form the division on almost any principle, but we must not change from one principle to another. Thus mankind may be divided into Europeans, Australians, Africans, Asiatics, or into Christians, Mahometans and Pagans. The division of mankind into Christians, Malays, Caucasians, Mahome-



tans, would be a bad and a cross division, because it is not made on one and the same principle.

(3.) The dividing members must exclude one another. Hence I must not divide Christians into Protestants, Roman Catholics, Presbyterians and Wesleyans, because there is no necessary opposition between Protestants and Wesleyans and Presbyterians, but the two latter are species of the former.

(4.) The *membra dividenda* should be co-ordinate. Thus, I ought not to divide organised existence into plants, men and sheep, &c., because plant is a class co-ordinate with animals, of which the other mentioned members are subordinate species.

II. *Physical* Division specifies the component parts of a physical whole. Thus plant would be divided into its root, its stem, its leaves and blossom.

*N.B.* Every physical divisum can only be predicated *collectively* of its parts; every logical divisum can be predicated distributively of its parts.

III. Division by Dichotomy. This is performed by making use of the Contradictory Terms. Thus men may be divided into Mathematicians and not-Mathematicians, or into learned and not-learned. This division is based on the principle of Excluded Middle, everything must be A or not-A.

## Chapter X

*On Logical Definition—On the rules of Logical Definition—On Nominal Definition—On Accidental Definition—On Physical Definition*

LOGICAL Definition gives the comprehension or connotation of a Concept, *i.e.* its Genus and Differentia. The more general abstract notions, such as animality, humanity, corporeity, can be logically defined, because they connote certain definite attributes, but such simple abstract notions as mercy, truth, justice, light, darkness, cannot be logically defined, because we cannot resolve them into simpler elements. Individual things or persons cannot be defined, because their distinctive attributes defy enumeration.

The rules of Logical Definition are four.

*First Rule.*—Let your definition be exactly equal to the definitum,—neither wider nor narrower. This rule forbids the insertion of separable accidents in a definition, for they, as belonging only to some members of the definitum, would render it too narrow. Defining man as a *learned* animal or as a *wise* animal would limit the definition to a small portion of the class man, and would so render it too narrow. A definition is too wide when it

applies to other notions as well as to the definitum. This fault frequently arises from substituting inseparable accidents for the differentia; inseparable accidents being predicable of other things as well as of the definitum.

*Second Rule.*—Refer the definitum to a better known class. The more extensive notions, as being more common, are generally more familiar, and therefore better known. In defining a notion we should always assign its genus as well as its differentia, and so give the whole of its comprehension.

*Third Rule.*—Mention in a definition only those attributes which are connoted by the definitum. Properties and inseparable accidents should never be inserted in a logical definition, because, on the principle of *Exceptio probat regulam*, it might be inferred that the attributes connoted by the definitum could or did exist without such properties or accidents.

*Fourth Rule.*—Express your definition in familiar language and rigorously exclude from it all metaphorical and equivocal terms.

*N.B.*—Many of our definitions must be after all provisional. The progress of scientific discovery may teach us that the attributes we now regard as constituting a particular class of objects are the result of some higher principle, and that those attributes which we now consider as imparting to the thing in question its special *constitution* are after all mere accidents or concomitants.

We cannot anticipate that the definitions in Euclid will require alteration, but it is impossible to predict what changes in our views of the conditions of animal existence, the progress of scientific discovery may require and render necessary.

(2.) Nominal Definition substitutes for the definitum a better known word or sentence, as The Decalogue is the Ten Commandments, or gives the etymology of the word.

(3.) Accidental Definition assigns the genus and some of the properties or accidents, as man is a being capable of communicating his thoughts and of being a member of a civil society.

(4.) Physical Definition assigns the external marks of the definitum, as man is a biped, erect and without wings. The man that committed the robbery was five feet in height, and had black hair, and was of sallow complexion, and had a scar on his left cheek. Physical Definitions occur in works on natural history, and are given when the description of an individual is required.

## Chapter XI

### *The Connection between Language and Thought*

THOUGHT may exist without language, but all the truths with which the Logician is concerned are truths expressed by words. The fact that children think and reason long before they can communicate their thoughts by language, proves that thought does not of necessity require, and does not always employ language. Children learn to avoid the flame which has once burned them, and expect that what has once pleased or pained them will continue to give them pleasure or pain. Scientific men are often unable to communicate to others the grounds on which they base their conclusion. There are delicate shades of thought inexpressible by words, there are intuitions which words cannot adequately declare.

(2.) Without language however, or some other medium by which thought could be registered and communicated, it is difficult to see how human progress would be possible. By language we record our own experiences, and are made acquainted with the abstractions and generalizations of others. Words frequently arouse inquiry and *so direct us to the knowledge of things.*

It is however in the reasoning process and in what it presupposes that we experience the need of external symbols for fixing and retaining our thoughts. Without words we should be unable to keep our notions distinct, and to prevent their being confused with one another. An act of judgment would be performed with difficulty, if we had no means of distinguishing and expressing the notions we wanted to compare. A long process of reasoning would be almost impossible if we had no words to express the attributes and to denote the subjects concerning which we reasoned.

(3.) There are however defects incident to language. Many words are equivocal, so that by the same word different notions are expressed. Words again do *not* always and for ever retain the same connotation. Many words convey to us a different meaning to that which they conveyed to our fathers. We should always look from the sign to the thing signified, and remember the aphorism of Hobbes, "that words are the idols of fools." We should remember too that all representative thought lacks distinctness and clearness, and that all notional knowledge is more or less unreal. Logic is useful if it tends to warn us of this, and if it leads us to look beyond the notion to the things and facts out of which we have formed them. In fact, logic could hardly confer a greater service than to make us fully aware of the comparative worthlessness of all merely notional knowledge. Logical Division, by placing before us

the lower notions out of which the higher notions were formed, affords in some measure a remedy against the indistinctness which so often accompanies many of our notions. Logical Definition, by placing separately before us the attributes connoted by the words we use, guards us, in a degree, against the inconveniences resulting from equivocal words, and directs us to a clear notion of the subjects about which we are thinking or conversing.

## PART II





## Chapter I

### *On Proposition—On the Six Divisions of Proposition*

THE second part of Logic treats of the laws of thought relating to Propositions.

A proposition is a sentence that affirms or denies. It is distinguished from all other sentences, because it affirms or denies, and so expresses truth or falsehood.

(2.) Logic cannot determine the material truth or falsehood of a proposition. It shews us, however, what other propositions are involved and necessarily implied in the propositions we make.

(3.) Propositions are divided on many different principles.

1st. We have Analytical and Synthetical Proposition.

An Analytical or Verbal proposition gives the whole or part of the connotation of the subject. Man is rational. Animals are living things having feeling. Mind is intelligent. A house is made to dwell in.

A Synthetical or Real Proposition is one whose predicate states something which is not involved in the connotation of the subject. All men are bipeds. Some animals are quadrupeds. All matter gravitates.

All triangles have all their angles equal to two right angles.

*2nd Division.*

Propositions are divided into Categorical, Conditional, and Disjunctive.

( $\alpha$ ) A proposition may make a direct statement, as Charles is wise. The Prussians are brave. It is then a Categorical proposition.

( $\beta$ ) A statement may be made subject to a condition, as If it rains, the ground is wet. If he had been virtuous, he would have been happy. This species of Proposition is called Conditional.

( $\gamma$ ) A proposition may state an alternative. It is either day or night. All lines are straight or curved. We then have the Disjunctive Proposition.

3. Categorical propositions are subdivided into the pure Categorical and the modal Categorical.

The pure Categorical makes an unqualified statement, as—Rainy weather is good for the herbage. The modal Categorical qualifies the statement by mentioning the manner in which the subject and predicate are related; as—Cretans are always liars. Bad men sometimes repent. A bad man may possibly repent.

The modal Categorical can easily be reduced to the form of a pure Categorical. In the examples given, the modal propositions are reducible to—All Cretans are liars. Some bad men repent. The repentance of a bad *man is possible*.

4. *Quality of Propositions.* The quality of a proposition is Affirmative, when agreement between the terms is affirmed. The quality of a proposition is negative, when agreement between the terms is denied.

5. *Quantity of Propositions.* A predicate may be affirmed or denied of a subject in three different ways. *First*, It may be affirmed or denied of all and each of the things or individuals denoted by the subject; as—All men are mortals. All men are bipeds. No brutes are rational. No men are quadrupeds. We thus have the *Universal* proposition.

*Secondly*, The predicate may be affirmed or denied of only a portion of the things or individuals denoted by the subject. We then have the *Particular Proposition*—Many men are wise. Some men are logicians. All men are not prudent. Not many men are virtuous. Most men are not unselfish.

*Thirdly*, The predicate may be jointly but *not separately* affirmed or denied of the things or individuals denoted by the subject. We thus have the *singular or Collective proposition*—All the men in the corps are 250. All the angles of a triangle are equal to two right angles. All the books in my Library are 500.

*N.B.*—The employment of a Singular or Collective term as tantamount to an Universal in a figured syllogism produces the fallacy of Division. All the books in my Library are 500.

Herodotus is a book in my Library.

Herodotus is 500 books.

All the angles of a triangle are equal to two right angles.

A B is an angle of a triangle.

A B is equal to two right angles.

The absurdity of the conclusion is in either of these cases immediately apparent. Whereas in the following:—All the books on my shelf are octavos.

Herodotus is a book on my shelf.

Herodotus is an octavo ;

the validity of the reasoning is immediately recognised.

When in reasoning in a figured syllogism Singular or abstract terms always retain the place of subject, no practical inconvenience results from considering the premiss Universal.

*N.B.*—The word *All* or *omnis* is only the sign of an Universal proposition, when the proposition is affirmative, and all may be translated into each and every. In a negative proposition, *all* is the sign of a particular negative. When *all* means *all together*, it is the sign of a Singular Collective proposition.

All men are bipeds = Universal proposition.

All men are not wise = Particular negative.

All my books amount to 100 = Collective or Singular proposition.

6. Propositions may be in extension or not in extension.

*All propositions* formed of Concepts are in extension ;

as—All men are mortal. All men speak = All men are beings which speak.

Propositions formed of Abstract or Singular or Collective nouns, or where the predicate is a definition of the subject, are not in extension. We shall call them *Identical* or Equipollent propositions. Homer is the Author of the Iliad.  $8 \times 2 = 16$ .  $4 + 2 = 6$ . Wellington was the General at Waterloo. Love is Charity. Bartholomew is Nathaniel.

In *all* identical or equipollent propositions the subject and predicate are so related that wherever we may place the subject we may place the predicate. We can transpose the terms of an *Identical* proposition at pleasure. Thus if I can say Love is Charity, I can say Charity is Love; or if I can say Virgil is the author of the *Æneid*,  $4 \times 4$  is 16, I can also say the author of the *Æneid* is Virgil,  $16$  is  $4 \times 4$ . If the predicate gives the *whole* of the connotation of the subject, on the principle of Identity, wherever I can place the predicate I can place the subject, and *vice versa*.

## Chapter II

### *On the Distribution of Terms—On Proposition in Extension*

A TERM is said to be distributed when it is used for *all* the things or individuals it denotes. When we say, all men are bipeds, the subject *all men* is distributed, because the term *mortal* is said of every individual which the term man denotes. Mortal is *not* distributed, because many individuals or things may be included under the term mortal which are not denoted by the term man.

(2.) When I deny a given attribute of a given subject, as when I say, No men are quadrupeds, Some men are not wise, it is evident that the predicate is excluded from the subject. We thus get the logical rule which holds universally in Propositions in extension.

Universal Propositions, and they only distribute their Subject; Negative Propositions, and they only distribute their Predicate.

(3.) Of propositions in extension we may make, for all practical purposes, a fourfold division,—Universal *Affirmative*, Universal Negative, Particular Affirmative,

Particular Negative. These different propositions are denoted by symbols.

Asserit A, negat E, universaliter ambæ ;

Asserit I, negat O, particulariter ambo.

A (Universal Affirmative) distributes subject only ;  
E (Universal Negative) distributes both the subject and the predicate ; O (Particular Negative) distributes predicate only ; I (Particular Affirmative) distributes no term.

(4.) Propositions formed of Concepts may be regarded either in reference to their extension *or* in reference to their comprehension. The proposition all men are mortal, I interpret in reference to its *extension*, if I understand it to mean all men are included under the class *mortal* beings. If I interpret it in reference to its connotation, I then understand it to mean all the attributes connotated by the concept mortal are comprehended in and form part of the Concept man. The former is the logical, and the latter is the metaphysical view of the proposition.



## Chapter III

### *On Opposition—On the Different Kinds of Opposition*

**O**PPPOSITION is an argument of two terms effected *by comparison*.

(2.) The *same* words in the opposed propositions must be used in the *same* sense. The fallacia Ignorationis Elenchi would result from the violation of this rule.

(3.) Opposition is of four kinds—(α) Contradictory, (β) Contrary, (γ) Subaltern, (δ) Subcontrary.

(α) Contradictory opposition is either between *A* and *O* or between *E* and *I*. The propositions, in this opposition, differ both in quantity and quality. This is the most perfect opposition, because, since the law of Contradictories is,—“They can never be true together, and they can never be false together”—we can always infer from the truth of the one to the falsehood of the other, and from the falsehood of the one to the truth of the other.

(β) Contrary opposition is between *A* and *E*. They can be false together but they *cannot* be true together. *Therefore from the truth of the one the falsehood of the*

other can be inferred, but from the falsehood of the one nothing concerning the other can be inferred.

( $\gamma$ ) Subaltern opposition is between *A* and *I* or between *E* and *O*. *A* and *E* are respectively called subalternans, and *I* and *O* are called subalternata.

The truth of the subalternans involves the truth of the subalternata, and the falsehood of the subalternata involves the falsehood of the subalternans, but the truth of the subalternata does *not* involve the truth of the subalternans, nor does the falsehood of the subalternans involve the falsehood of the subalternata.

( $\delta$ ) Subcontrary opposition is between *I* and *O*.

Subcontraries can be true together but *cannot* be false together. Therefore from the falsehood of the one the truth of the other can be inferred, but from the truth of the one nothing concerning the other can be inferred.

2. From the truth of an Universal or the falsehood of a Particular an inference can be drawn respecting the other three forms of the proposition, but from the truth of a Particular or from the falsehood of a Universal proposition only one inference can be drawn.

Let *A* be true, *O* and *E* are false, and *I* is true.

Let *E* be true, then *O* is true, and *A* and *I* are false.

Let *I* be true, then *E* is false, but of *O* and *A* I know nothing.

Let *O* be false, then *E* is false, and *A* and *I* are true.

Let *A* be false, then *O* is true, but of *E* and *I* I know nothing.

## Chapter IV

### *On Conversion—On the Conversion of Identical Propositions*

CONVERSION is the transposition of the terms of a proposition. The proposition to be converted is called the *Exposita* or *Convertenda*; the proposition when converted is called *Conversa*.

(2.) In identical propositions the subject and predicate are co-extensive. Therefore the subject may become the predicate and the predicate can become the subject. Every identical proposition can be *simply* transposed. The simple transposition of the terms of a proposition is *Simple Conversion*. Let the *exposita* be, John is not Peter. Peter is Cephas. Love is charity. Wellington was the General and Conqueror at Waterloo. Virgil was the Author of the *Æneid*. The *conversæ* will be, Peter is not John. Cephas is Peter. Charity is Love. The General and Conqueror at Waterloo was Wellington. The Author of the *Æneid* was Virgil.

## Chapter V

*On the Conversion of Propositions in Extension—On Simple Conversion  
—On Conversion per Accidens—On Conversion by Negation*

THE great rule of Conversion of Propositions in extension is,—Let *no* term be distributed in the *Conversa* which has been undistributed in the *Exposita*.

(2.) There are three kinds of Conversion—(α) Simple Conversion, (β) Conversion per Accidens, (γ) Conversion by Negation.

(α) When the quantity and quality of the *Exposita* and *Conversa* are the same, we have Simple Conversion. Only co-extensive propositions can be converted by this method. Both terms are distributed in E, and I distributes no term. E and I can therefore be simply converted. Let the *Expositæ* be, (1) No men are brutes, (2) No horses are bipeds, (3) Some men are wise: the *Conversæ* will be, (1) No brutes are men, (2) No bipeds are horses, (3) Some wise beings are men. A cannot be converted simply because, although the subject is distributed, the predicate is not distributed. It is converted *per Accidens*, and also by Conversion by Negation.

( $\beta$ ) Conversion per Accidens or by Limitation is when the quantity of the *Conversa* is particular and the quantity of the *Exposita* is universal. Let the *expositæ* be, (1) All men are bipeds, (2) All horses are quadrupeds: the accidental *conversæ* will then be, (1) Some bipeds are men, (2) Some quadrupeds are horses.

( $\gamma$ ) Conversion by Negation is when the quality of the *Exposita* is different from the quality of the *Conversa*. The conversion of A by this method involves

Three steps,

(1.) Substitution of the universal negative (No) for the universal affirmative sign (A).

(2.) Affixing contradictory term to the predicate.

(3.) Transposition of terms.

Let the *expositæ* be, (1) All men are selfish, (2) All horses are quadrupeds. The first change is, (1) No men are selfish, (2) No horses are quadrupeds. The second change is, (1) No men are not selfish, (2) No horses are not quadrupeds. The third step is transposition, (1) No not selfish are men, (2) No not quadrupeds are horses. The different forms or permutations of these negative *conversæ* are, None but selfish are men; Only selfish are men; Selfish and they only are men; Whoever is not selfish is not a man; Selfish beings alone are men; Without being selfish you cannot be a man. Or of (2), Only quadrupeds are horses; Quadrupeds alone *are horses*; Whatever is not a quadruped is not a horse.

(2.) *O* is said to be converted by this method. *O* is

accordingly reduced to the form of I, and then the terms are transposed. Attach the *not* to the predicate, and if the sign of O is *all*, change it to *some* and then transpose. Let the expositæ be, (1) All men are not wise, (2) Some men are not Logicians, (3) Some rich men are not happy.

Let them be first reduced to the form of I, by attaching by a hyphen the *not* to the predicate.

- (1.) Some men are not-wise.
- (2.) Some men are not-Logicians.
- (3.) Some rich men are not-happy.

The conversion will then be,

- (1.) Some not-wise are men.
- (2.) Some not-Logicians are men.
- (3.) Some not-happy are rich.



## PART III





## Chapter I

### *On the different kinds of Inference*

WHENEVER our knowledge of anything is traceable to our knowledge of something else, it is said to be by Inference.

(2.) Inference takes place in notions. On the principle of excluded middle from knowing that not man is incompatible with a given concept, I infer that man is compatible with it and is involved in it. I also infer that, since no notion can contain, at the same time, contrary attributes, if in any concept the attribute goodness be present, the contrary attribute, badness, must be absent.

(3.) *Inference in Judgment.*—The inference in Judgments is either (1) Material, arising from the signification of the words used, as Richard is John's father, therefore John is Richard's son.

All Englishmen are subjects of Queen Victoria.

Queen Victoria is Queen of England.

Or (2) Formal, when the judgment flows from the laws of thought. Of this kind are all the inferences effected by Opposition and Conversion.

(4.) Inference may be either Immediate and Direct or Mediate. All our Inferences in the first and second part of Logic are Immediate or Direct Inferences; and the Judgments effected by Conversion and Opposition may be called Direct, Immediate, or Implied Judgments.

(5.) The Inference in the third part of Logic is Syllogistic or Mediate Inference. It is called Mediate Inference, because it is always made by reference to some third or middle term.

## Chapter II

### *On Syllogism*

**S**YLLOGISM defined. A Syllogism is an argument of three terms, in which one term is determined to be predicable or not predicable of another term, from a comparison being made between those terms, and one and the same third term.

(2.) The terms on whose agreement we determine by the syllogistic process are called the Extremes, and the term with which they are compared is called the Middle term. In every good syllogism the middle term will appear in each of the premisses, but will never appear in the conclusion.

(3.) The proposition in which the extremes are compared is called before proof the Question, and after proof the Conclusion.

(4.) The position of the premisses and the conclusion in a syllogism is indifferent.

We may place the conclusion first, as John is mortal, for all men are mortal; and John is a man; or (2) we may place the minor premisses first, as John is a man. All men are mortal, therefore John is mortal; or (3) we

may place the major premisses first, as, All men are mortal; John is a man, therefore John is mortal.

(5.) Syllogisms are either formed of Concepts, and are therefore in extension; or are formed of abstract or singular notions, and are therefore not in extension.

## Chapter III

### *On the Rules applicable to all Syllogisms*

#### 1st Rule.

THERE must be only three terms. We determine whether one term is predicable or is not predicable of a second term by comparing them both with a third term.

(2.) The middle term must not be equivocal. An equivocal term would be two middle terms in meaning, and one in sound. If, therefore, the middle term is equivocal, one and the same middle term is not introduced to compare together the extremes.

(3.) One premise must be affirmative. If both were negative, a middle term would have been introduced with which neither of the extremes had agreed, so that they would not have been compared; as,

Peter is not John.

Peter is not Matthew,

therefore no conclusion.

(4.) If one premiss is negative the conclusion is negative. By the last rule the other premiss must be affirmative; therefore one extreme agrees with the mid-

dle term and the other disagrees; therefore the extremes disagree; therefore the conclusion is negative.

(5.) If the conclusion is negative, one of the premisses must be negative. Since the conclusion is negative, the extremes must disagree, and therefore one of the extremes must agree with the middle term, and be affirmative; and the other, as disagreeing with it, must be negative.

(6.) The above rules are quite sufficient tests of all deductive reasoning not in extension :

Thus—

( $\alpha$ ) Love is charity.

Kindliness is love.

Kindliness is charity.

( $\beta$ )  $4 \times 4 = 8 \times 2$ .

$8 \times 2 = 16$ ,

therefore  $4 \times 4 = 16$ .

( $\gamma$ ) He that has seven cities claiming the honour of his birth is the author of the Iliad.

Homer is the author of the Iliad,

therefore Homer has seven cities claiming the honour of his birth.

( $\delta$ ) Nathaniel is not Peter.

Nathaniel is Bartholomew.

Bartholomew is not Peter.

( $\epsilon$ ) Peter is Cephas.

Peter is not John.

*John is not Cephas.*

(7.) It is evident that neither the Dictum de Omni et Nullo nor the rules of the Figures apply to the above syllogisms.

The principle of syllogisms not in extension is—  
 “Things which are identical with or equal to one and the same things are themselves identical or equal. Things which are neither identical with nor equal to one and the same things are not themselves identical nor equal.”  
 Or in other words, the first two canons of Aldrich.

For affirmative reasoning—

*Quæ conveniunt in uno aliquo eodemque tertio, ea conveniunt inter se.*

For negative reasoning—

*Quorum unum convenit, alterum differt uni eodemque tertio, ea differunt inter se.*



## Chapter IV

### *On Syllogisms in Extension*

THE predicate of the Conclusion or Question is the Major term; the subject of the Conclusion or Question is the Minor term. (The words minor and major have only a correct and intelligible meaning when applied to syllogisms in the first figure, where the major term is always more extensive than the middle term, and the middle is more extensive than the minor.)

(2.) The premiss in which the Major term is compared with the Middle term is the Major Premiss, and that with which the Middle term is compared with the Minor term is the Minor Premiss.

## Chapter V

### *Special Rules of Syllogisms in Extension*

ALL syllogisms in extension are subject to the following rules, and also to the rules mentioned in Chapter III. :—

(1.) The middle term must be *once* distributed. If it were not once distributed, one of the extremes might agree with one part of the middle, and the other extreme with the other part of it. The extremes in that case would not have been compared. All men are mortal. All pigs are mortal, therefore all pigs are men.

(2.) It is sufficient if the middle term be once distributed. If one extreme is compared with the whole of the middle term, and the other extreme with only a part of it, the extremes are compared together. (In the first two figures the middle term is only distributed once. AAI and EAO in the third figure, and EAO in the fourth figure, distribute the middle term in both of the premisses.)

(3.) No term must be distributed in the conclusion which has not been distributed in the premisses. In an undistributed term, the term only applies to a part of

the things which it denotes, therefore to distribute a term in the conclusion which has not been distributed in the premisses is the same as the inferring E from O or A from I.

When any term not distributed in the premisses is distributed in the conclusion, then it is said to be an illicit process of that term.

All men are bipeds; no pigs are men, therefore no pigs are bipeds. Here there is illicit process of the Major. All men are mortal; all men are rational, therefore all rational are mortal. Here there is illicit process of the Minor term.

(4.) Both premisses must not be particular.

There are four possible combinations of two particular premisses—II, OO, IO, OI.

II is not admissible, because no term would be distributed. (Rule 1, ch. v.)

OO must be rejected, because of two negative premisses. (Ch. iii., Rule 3.)

IO or OI cannot stand, because they would either involve an undistributed middle or illicit process of the major term.

(5.) If one premiss is particular, the conclusion is particular.

Of this there are four possible combinations—AI, EO, AO, EI.

(a) EO is *not* admissible, because both of the premisses are negative. (Ch. iii., Rule 3.)

( $\beta$ ) AI. A distributes the middle term, but neither of the extremes is distributed in the premisses, therefore neither can be distributed in the conclusion, therefore the conclusion must be I.

( $\gamma$ ) AO and EI respectively distribute two terms, of which one is the middle, therefore only one term can be distributed in the conclusion, and, since the conclusion must be negative, it must be O.

( $\alpha$ ) All men are mortal.

Some beings are men.

Some boys are mortal.

( $\beta$ ) All men are bipeds.

Some beings are not bipeds.

Some beings are not men.

( $\gamma$ ) No bad men are happy.

Some rich men are bad.

Some rich men are not happy.

(6.) If you have O as a premiss, you must have O as conclusion. For if one premiss is O, the other is A. AO distributes two terms, of which one is the middle, therefore since the conclusion must be negative, it must be O.

(7.) If the conclusion is particular, it is not necessary that one of the premisses should be particular. By the laws of Subaltern Opposition, the truth of the Subalternans involves the truth of the Subalternata. Therefore, whenever I can infer E or A, I am justified in

inferring I or O. A logical reasoner does not make more universal statements in the premisses than the conclusion necessarily requires, because universal statements are much more easily overthrown than particular statements.

The rules of syllogistic reasoning are summed up in the following lines:—

*Distribuas medium nec quartus terminus adsit.*

*Utraque nec præmissa negans nec particularis.*

*Sectetur partem conclusio deteriolem.*

*Et non distribuat, nisi cum præmissa, negative.*

The third line means—

If one premiss is negative, the conclusion is negative.

If one premiss is particular, the conclusion is particular.

Logicians consider a particular conclusion worse (deterior) than an universal, and a negative conclusion worse than an affirmative.

## Chapter VI

### *On the Moods and Figures*

MOOD is the arrangement of the propositions symbolized by A, E, I, O. If we include the conclusion as forming part of the mood, we shall have sixty-four variations. For as any of the four (A, E, I, O) may be the major, and as each of the majors may have four different minors, we at once have sixteen pairs of premisses, and, as each of the sixteen pairs of premisses may be combined with four different combinations, the moods will be sixty-four. Of moods, however, in the sense of such an arrangement of propositions as the laws of syllogism require, (*legitima determinatio propositionum secundum quantitatem et qualitatem*,) AAA, AAI, AEE, AEO, AII, AOO, EAE, EAO, EIO, IAI, OAO will be the only moods. The laws of syllogism, therefore, will only admit of eleven moods.

(2.) 1. *Figura* consists in the arrangement of the middle term in reference to the extremes.

*Figura*, according to Aldrich, est *legitima dispositio medii cum partibus quæstionis*.

2. Aristotle admits only three figures; looking to the

relative extension of the middle term as compared with that of the other terms.

(3.) There are generally reckoned four Figures. In the First Figure the middle term is subject of the Major Premiss and predicate of the Minor Premiss. In the Second Figure the middle term is predicate of BOTH Premisses. In the Third Figure the middle term is subject of both Premisses. In the Fourth Figure the middle term is predicate of the Major Premiss, and subject of the Minor Premiss.

## Chapter VII

*The Special Rules of the Figure—The Dictum de Omni et Nullo—  
Principles of the Second and Third Figures*

THE special rules of the Figures 1, 2, 3, are given in the following lines:—

1. Sit minor affirmans, majorque sit universalis.
2. Sit præmissa negam, majorque sit universalis.
3. Sit minor affirmans, conclusio particularis.

(2.) The Dictum de Omni et Nullo, or whatever you affirmatively or negatively predicate of a class you so predicate of everything which that class contains, is considered in many logical treatises to be the sole principle of all deductive reasoning. The moods or syllogisms in the First Figure, to which it immediately and directly applies, are accordingly called Perfect Moods or Syllogisms, while the Syllogisms in the other Figures are called Imperfect Moods or Syllogisms. These latter it is considered necessary to reduce to the form of the First Figure, in order to render the reasoning certain and evident.

(3.) It was pointed out in Chapter III. of this part that the Dictum only applies to reasoning in extension. It is true that any mood in the lower figures can be reduced to a mood in the first figure, but it is also true



that any mood in the first figure can be reduced to a mood in the lower figures, and both processes are equally unnecessary. The ordinary rules of syllogism, and the special rules of the figures, are sufficient tests of the cogency of the reasoning in any syllogism. The second and third figures have respectively a principle of their own. The principle of the second figure is—Whenever you can predicate certain attributes of one term which you cannot predicate of another term, these two terms must disagree. The principle of the third figure is—Two terms which contain a portion in common must partially agree, and two terms, whereof the one contains a part which the other does not contain, must partially differ. It is quite as natural to reason in the second or third figure as to reason in the first. The second figure is best adapted for inferring universal negative conclusions, and the third figure is the best figure for proving exceptions and drawing particular conclusions.

(4.) The Fourth Figure is of no practical use. It would be much better to adhere to Aristotle's division of the Figures, and to recognize only Three Figures. The first figure, in which the middle term, as being the subject of the major premiss, and predicate of the minor, is more extensive than the minor term, and less extensive than the major. The second figure, in which the middle term, as being the predicate of both premisses, is the most extensive of the terms; and the third figure, in *which the middle term*, as subject of both premisses, is *the least extensive* of the terms.

## Chapter VIII

### *Proofs of the Special Rules*

#### First Figure—

FIRST special rule is—The minor premiss must be affirmative. If it were negative, the major premiss would be affirmative, and the conclusion negative. The major term would then be distributed in the conclusion, and not in the major premiss, and so there would be illicit process of the major. Thus—

All men are bipeds. No pigs are men. No pigs are bipeds. All men are mortal. Some beings are not men, therefore some beings are not mortal.

Second special rule.—The major premiss must be *universal*. Since the minor premiss must be affirmative, the middle term will not be distributed in that premiss, therefore it must be distributed in the major premiss, therefore the major premiss must be universal.

#### Special Rules of the Second Figure—

1. One premiss must be negative.

Since the middle term is the predicate of both premisses, and since negatives alone distribute the

predicate, one premiss must be negative, or there will be undistributed middle term.

2. The conclusion must be negative.

Since one premiss is negative, the other must be affirmative, therefore conclusion is negative.

3. The major premiss must be universal.

Since the conclusion must be negative, the major term must be distributed in the conclusion, and must therefore be universal.

#### Third Figure—

First special rule.—The minor premiss must be affirmative. For if it were negative we should have negative conclusion and major premiss affirmative, and therefore illicit process of the major term; as, all men are bipeds; no men are pigs, therefore no pigs are bipeds.

Second special rule.—The conclusion must be particular. Since the minor premiss by the last rule must be affirmative, it will not distribute the minor term, therefore the minor term must be not distributed in conclusion, therefore it must be particular.

*N.B.*—O is sometimes treated as I, and then the reasoning is in *apparent* opposition to the first special rule of this figure, thus—

All men are bipeds.

Some men are not wise.

Some not wise are bipeds.

#### Fourth Figure—

*The special rules usually given are, that the conclu-*

sion must not be A, and that neither of the premisses must be O.

Nec sit O præmisses nec sit A conclusio.

These rules, however, are not sufficiently exclusive, as they do not exclude AAI, IEO, and EAE.

The proper rules of the fourth figure are—If the major premiss be affirmative, the minor premiss must be universal. For in this figure, since the middle term is the predicate of the major premiss, it would, if the premiss were affirmative, be not distributed, therefore it must be distributed in the minor premiss, of which premiss it is the subject, therefore the minor premiss must be universal.

Second special rule.—If the minor premiss be affirmative, the conclusion must be particular. For the minor term is the predicate of the minor premiss, and consequently will be not distributed, therefore the conclusion must not distribute it, therefore it is particular.

Third special rule.—If the conclusion is universal the minor premiss must be negative. For since the minor term is predicate of the minor premiss it cannot be distributed unless the minor premiss is negative; and if the premiss does not distribute it the conclusion must not distribute it, or else there would be an illicit process of it.

In the rules of the first three figures the succeeding rule is a consequence or corollary of the preceding, but this is not the case in the rules of the fourth figure.

## Chapter IX

*On Reduction—Its different kinds—The process of Reduction explained .*

REDUCTION, as we said in Chapter VII., proceeded on the principle that the Dictum is the only sure basis of Deductive reasoning, and is accordingly defined “the bringing an imperfect mood into a perfect one—in order to make the validity of the reasoning clear and certain.”

Reduction is either Ostensive or per Impossible.

Ostensive Reduction is when the conclusion is the same as the original conclusion, or its converse. It is performed by conversion only, or by conversion and the transposition of the premisses.

According to the *old* Logicians, whom we will for the present follow, all the moods, but AOO and OAO, are reduced ostensively, but AOO and OAO are reduced by the other method.

These moods, AOO and OAO, could *not* be reduced ostensively by the older Logicians, because they did *not* recognise the conversion of O by negation. It was, however, necessary, in order to shew the validity of the reasoning in AOO and OAO, to bring them to the first figure, and the method adopted was Reductio per Impossibile.

This process is performed by constructing a new syllogism, combined of one of the original premisses and the contradictory of the original conclusion. There then results a conclusion which contradicts the omitted premiss and the original conclusion. The reasoning cannot be wrong, for it is conformable to the dictum, and the original premisses are assumed to be true, therefore the new premisses in the new syllogism must be false, and its contradictory must be true; but its contradictory is the conclusion of the original conclusion, and therefore the conclusion of the original syllogism is true.

Reductio per Impossible is based on these principles—(1) That Contradictories can never be true together. (2) That the original premisses are true. (3) That the conclusion in the reduced syllogism is the logical consequent of the premisses.

The following mnemonic lines have been made to facilitate the process of reduction:—

1. Barbara, Celarent, Darii, Ferioque prioris.
2. Cesare Camestres, Festino, Baroko secundæ.
3. Tertia Darapti Diramis Dalisi Felapton  
Bokardo Ferison habet; quarta insuper addit.
4. Bramantip, Camenes, Dimaris, Ferapo, Fresison.  
Quinque subalterni totidem generalibus orti  
Nomen habent nullum nec sibene colligis usum.

The generales modi mentioned above are all those moods which draw *universal* conclusions.

Barbara, Celarent, Cesare Camestres, Camenes. When-

ever (by Rule 7, ch. iv.) the premisses admit of an universal conclusion, a particular may be drawn. There are therefore five subaltern or innomines modi—Barbari Celaront, Cesaro, Camestros, Camenos.

The vowels in the words Barbara, &c., indicate the moods; the first vowel representing the major premiss, the second the minor premiss, and the third vowel the conclusion. The initial consonant informs us to what mood in the first figure the imperfect mood is to be reduced. The other symbolical letters always refer to the premiss indicated by the preceding vowel, and the following lines give their meaning:—

S vult simpliciter verti, P vero per acci

M vult transponi, K per impossibile duci.

Examples of reduction.—Let us take Darapti, Disamis Camenes, Baroko, Bokardo.

Dar All men are bipeds.  
 ap All men are mortals.  
 ti Some mortals are bipeds.

Reduced to—

Dar All men are bipeds.  
 | Some mortals are men.  
 | Some mortals are bipeds.

Dis Some men are wise.  
 am All men are rational.  
 is Some rational are wise.

Reduced to—

Dar All men are rational.  
 | Some wise beings are men.  
 | Some wise beings are rational.

Cam All men are rational.  
 en No rational are brutes.  
 es No brutes are men.

Reduced to—

Ces No rational are brutes.  
 ar All men are rational.  
 e No men are brutes.

Bar All men are rational.  
 ok Some beings are not rational.  
 o Some beings are not men.

Reduced to—

Bar All men are rational.  
 ba All beings are men.  
 ra All beings are rational.

Bok Some men are not wise.  
 ar All men are bipeds.  
 do Some bipeds are not wise.

Reduced to—

Bar All bipeds are wise.  
 ba All men are bipeds.  
 ra All men are wise.



AOO and OAO can, by employing conversions by negation, be reduced ostensively. Let AOO be called Fakoro, and let OAO be called Dokamok, and let k signify conversion by negation, and let the remaining symbols retain their usual meaning.

Fak All men are rational.  
 or Some beings are not rational.  
 o Some beings are not men.

Reduced to—

Fer None but rational beings are men.  
 i Some beings are not rational.  
 o Some beings are not men.

Dok Some men are not wise.  
 am All men are bipeds.  
 ok Some bipeds are not wise.

Reduced to—

Dar All men are bipeds.  
 | Some not wise are men.  
 | Some not wise are bipeds.

Disregarding the symbolical letters in the mnemonic lines relating to the figures, we may reduce any mood per impossibile. Let us reduce per impossibile AII, AEE, IAI.

A All men are bipeds.  
 I Some men are wise.  
 I Some wise are bipeds.

Reduced per impossibile—  
 No wise are bipeds.  
 Some men are wise.  
 Some men are not bipeds.

- A All men are bipeds.
- E No infallible beings are bipeds.
- E No infallible beings are men.

Reduced per impossibile—  
 No infallible are bipeds.  
 Some men are infallible.  
 Some men are not bipeds.

- I Some men are wise.
- A All wise beings are rational.
- I Some rational beings are men.

Reduced per impossibile—  
 No rational beings are men.  
 All wise beings are rational.  
 No wise beings are men.

The rule for reducing any mood by *Reductio per Impossibile* is—Construct a new syllogism of the contradictory of the conclusion of the syllogism to be reduced and of one of the original premisses, and employ conversion if necessary.

A perfect mood may be brought into the form of some other perfect mood. Thus, *Ferio* may be brought to the form of *Celarent*, as

Fer No men are quadrupeds.  
 i Some beings are men.  
 o Some beings are not quadrupeds.

To Celarent—

No quadrupeds are men.  
 All beings are quadrupeds.  
 No beings are men.

Dar All men are mortal.  
 | Some beings are men.  
 | Some beings are mortal.

To Celarent—

No mortals are beings.  
 All men are mortal.  
 No men are beings.

Again—A perfect mood may be changed to an imperfect one per impossibile, as—

All men are mortal.  
 Some beings are men.  
 Some beings are mortal.

To second figure—

Ces No beings are mortal.  
 ar All men are mortal.  
 e No men are beings.

Or by ostensive reduction to third—

All men are mortal.  
 Some men are beings.  
 Some beings are mortal.

## Chapter X

### *Cumulative Arguments*

ATTENTION should be directed to the following arguments:—

( $\alpha$ ) Most men have coats.

Most men have waistcoats.

Some men have both coats and waistcoats.

( $\beta$ ) Not half of men have shoes.

Not half of men have stockings.

Therefore some men have neither shoes nor stockings.

We are warranted in drawing the inference in ( $\alpha$ ) because, if we have two predicates applying to most of the class men, both must apply to some of them; and again, (in  $\beta$ ), if more than half of the class are without shoes, and more than half without stockings, therefore some must be without both. This kind of argument is sometimes adduced to shew the incompleteness of the ordinary doctrine of syllogism. The reply usually made is that the arguments depend for their validity on a suppressed major premiss, and can therefore be reduced to syllogistic form.

## Chapter XI

### *Conditional Reasoning*

A CONDITIONAL syllogism is one that has one or more conditional propositions. The clause with the *if* or its equivalent is the Antecedens or Conditio, and the other clause is the Consequens or Assertio.

Conditional syllogisms are either ( $\alpha$ ) Constructive or ( $\beta$ ) Destructive.

(1.) A good Constructive Conditional Syllogism is one which, from the admission of the Antecedent, infers the Consequent. (*Posita Antecedente recte ponitur Consequens.*)

( $\alpha$ ) 1. If it has just rained the ground is wet.

It has just rained.

The ground is wet.

( $\beta$ ) 2. Unless he is wise, he is not happy.

He is not wise.

He is not happy.

(2.) A good Destructive Conditional is when, from the Contradiction of the Consequent we infer the Contradiction of the Antecedent. (*Sublata Consequente, recte tollitur Antecedens.*)

1. If it has rained the ground is wet.  
The ground is not wet.  
It has not rained.
2. Unless we are vicious, we are not miserable.  
We are miserable.  
We are vicious.
3. If the Pope is infallible, he is not an ordinary man.  
He is an ordinary man.  
Therefore he is not infallible.

(3.) From the admitting the Consequent or contradicting the Antecedent no legitimate inference is made. (Posita Consequente vel sublata antecedente nihil certo colligetos.)

- ( $\alpha$ ) A *bad* Constructive Conditional Syllogism is when the Antecedent is inferred from the Consequent, as,  
If it has rained the ground is wet.  
The ground is wet.  
Therefore it has rained.

- ( $\beta$ ) A *bad* Destructive Conditional Syllogism infers the Contradictory of the Consequent from the Contradictory of the Antecedent—  
If it has rained, it is wet.  
It has not rained.  
It is not wet.

(4.) Reduction of Conditional Syllogisms to Categorical shews that a good Constructive corresponds to a good syllogism in the first figure, and that a good Destructive corresponds to good syllogism in second

figure; and that bad Destructive corresponds to syllogism in first figure with illicit process of the major, and that bad Constructive corresponds to syllogism in second figure with undistributed middle. Thus—

( $\alpha$ ) If C is good, he is happy.

C is good, therefore he is happy; reducible to—

All good are happy. C is good, C is happy.

( $\beta$ ) If C is good, he is happy. C is not happy, C is not good; reducible to—All good are happy. C is not good, C is not happy.

( $\gamma$ ) If C is good, he is happy. C is not good, he is not happy; reducible to—All good are happy. C is not good, C is not happy.

( $\delta$ ) If C is good, he is happy. C is happy, therefore C is good; reducible to—All good are happy. C is happy, therefore C is good.

(5.) Reducing Conditional Propositions.—A Conditional Proposition can be converted (*i.e.* the antecedens and consequens may be made to change places), by contradicting both parts of the proposition. Thus, let the convertendæ be—

1. If C is good, he is happy.
2. Unless it has rained, the ground is dry.
3. If C is wise, he will not repent.

The conversæ will be—

1. If C is not happy, he is not good.
2. If the ground is not dry, it has rained.
3. If C repents, he is not wise.

## Chapter XII

### *Disjunctive Reasoning*

A DISJUNCTIVE syllogism is one whose major premiss consists of a disjunctive proposition, whose minor contains affirmation or denial of one side of the alternative, and whose conclusion contains the affirmation or denial of the others, as, He is living in Spain, Portugal, or France. He is living in Spain, therefore he is not in Portugal or France.

He is either at Rome or Naples. He is not at Naples, therefore he is in Rome.

The rule of the disjunctive syllogism is, that the disjunctive premiss should be exhaustive. Hence the following argument is bad:—

University rewards are useless, for those fond of study do not want them, and they can have no effect on those who are indifferent to mental improvement. There may be an intermediate class to whom some incentive to study may be useful.



## Chapter XIII

### *Dilemma*

THE dilemma is an argument whose major consists of two conditional propositions, its major stating the antecedents disjunctively, and its conclusion stating the consequents disjunctively.

If the books in the library contain more or less than what is in the Koran, they are bad.

If the books contain only what is in the Koran, they are useless.

They must contain either what is in the Koran or more or less than what is in it.

Therefore they are bad or useless.

This is called by some a constructive dilemma, because it leads to a practical conclusion, which in this case is, Burn them.

A dilemma may be faulty either because the major premiss does not exhaust the alternatives, as in—

Si ducenda est uxor aut formosa ducenda est aut deformis.

Atqui non est ducenda formosa neque deformis—ergo *nulla uxor ducenda est.*

---

Or, secondly, it may admit of retort (*βλασιῶσις*), as—

(α) If you speak well men will hate you, if you speak ill gods will hate you; but you must speak well or ill, therefore gods or men will hate you, may be retorted.

(β) If you speak well gods will love you, if you speak ill men will love you; you must speak well or ill, therefore men or gods will love you.

As the former of those is intended to lead to the practical conclusion, Do *not* study rhetoric, it is called a Destructive Dilemma, and as the latter is composed to lead to the conclusion, Study rhetoric, it is a Constructive Dilemma.

## Chapter XIV

### *On Chains of Reasoning*

#### 1. Sorites.

A SORITES is generally defined, a series of propositions in which the predicate of the preceding is the subject of the succeeding, till you come to the last, when the subject of the first is the subject of the last, and the predicate of the last is the predicate of the last but one. It may be reduced to syllogisms in the *first* figure, the conclusion of each being the minor premiss of the next. There will be as many syllogisms as there are intermediate propositions between the first premiss and the conclusion; the first premiss being the only minor premiss stated. Hence the *first special* rule is only the first premiss, and the conclusion can be Particular; the others having, in the reduction, to stand for major premisses in the first figure. The last premiss and the conclusion alone can be negative, for otherwise we should have a negative minor premiss in the next syllogism.

*Some men are wise; all wise are prudent; all prudent*

are prosperous; all prosperous are happy; all happy are good; no good are knaves; some men are not knaves.

Let the *reducendus Sorites* be—

All prudent are temperate.

All temperate exercise self-restraint.

All exercising self-restraint are wise.

No wise are passionate.

No prudent are passionate.

This may be reduced—

1st syllogism—All temperate exercise self-restraint.

All prudent are temperate.

All prudent exercise self-restraint.

2nd syllogism—All exercising self-restraint are wise.

All prudent exercise self-restraint.

All prudent are wise.

3rd syllogism—No wise are passionate.

All prudent are wise.

No prudent are passionate.

The above *Sorites* may be given in the reverse order, thus—

No wise are passionate.

All exercising self-restraint are wise.

All temperate exercise self-restraint.

All prudent are temperate.

No prudent are passionate.

The above may be thus reduced—

1st syllogism—All temperate exercise self-restraint.

All prudent are temperate.

All prudent exercise self-restraint.

2nd syllogism—All exercising self-restraint are wise.

All prudent exercise self-restraint.

All prudent are wise.

3rd syllogism—No wise are passionate.

All prudent are wise.

Therefore no prudent are passionate.

If the above form be a correct form of Sorites, the description we have given of Sorites must be altered. For here we have a series of propositions in which the subject of each is the predicate of the next, till you come to the conclusion, when the predicate of the first is the predicate of the conclusion.

•

## Chapter XV

### *On Prosyllogism or Epicheirema*

SOMETIMES a syllogism may contain a premiss whose proof we may wish to suggest. We can suggest the proof of one or of both of the premisses by a Prosyllogism or Epicheirema, thus—

Everything unjust is odious.

Cæsar, as seeking to be a tyrant, is unjust.

Cæsar is odious.

The minor premiss in the above is in fact an ordinary syllogism, of which the part called the prosyllogism, "*as seeking to be unjust,*" is the middle term, thus—

All men seeking to be tyrants are unjust. Cæsar is seeking to be a tyrant, therefore *Cæsar is unjust.*

Aldrich well defines Prosyllogism,—"Antecedens Enthymematicæ premissæ."

## Chapter XVI

*On the use of the Third Part of Logic*

THE laws of Syllogistic Inference cannot tell us whether a given conclusion is materially correct, but only whether it is the necessary consequence of the premisses. The laws of Inference, by shewing us what our assents or beliefs necessarily involve, frequently lead us to re-examine and to review the grounds on which we have accepted them. The laws of Syllogism shew us the various sources from which inconsequent or bad reasoning arises, and so enable us to examine our own arguments, or those of others, and to determine whether the conditions of arriving at a correct conclusion have been duly regarded.

## PART IV





## Chapter I

*Demonstrative and Probable Reasoning—Probable Arguments—  
Enthymeme—Exemplum—Analogy*

REASONING may be either Demonstrative or (2.) Probable.

Demonstrative reasoning is when your conclusion logically follows from admitted premisses, and therefore admits of no degrees.

*Probable* reasoning admits of no degrees ; it may vary, in the nature of its evidence, from the smallest possible presumption to the highest moral certainty. Most of the conclusions in practical life are based on probable reasoning. The merchant, when he engages in his speculations, does so from the belief that there is a probable chance of success. The statesman advocates his measures because they will probably promote the well-being of the people. The advocate arranges his arguments to show that it is probable that his client's cause is the just one. Wherever men's reasoning are to influence others in forming practical conclusions, their reasonings are of a probable nature. Their arguments belong rather to Rhetoric than to Logic, as they are

calculated to persuade the will more than to convince the intellect. Probable reasonings are (1) Enthymeme, (2) Exemplum, (3) Analogy.

(1.) Enthymeme is defined by Aristotle—*συλλόγισμος ἐξ εἰκότων ἢ σημείων*.

An *είκος* is a probable proposition or premiss, as, hatred follows envy; most men love their children.

Under the head of *είκος* may be included circumstantial evidence, where the evidence leads to a probable conclusion, but where the conclusion may be gainsaid. This man is the murderer, for he was seen in an excited state after the murder, and was found by the policeman with blood on his clothes, and shortly before the murder is known to have quarrelled with the man found dead.

Of the *σημεία* there are three kinds. The first kind is when it always accompanies the fact of which it is a sign, and is then called a *τεκμήριον*, as, All just are honest. John is just, John is honest. A second kind of *σημείον* gives rise to a syllogism in third figure, as, Socrates is wise; Socrates is just, therefore all just are wise. The third kind of *σημείον* gives rise to a syllogism in second figure, as, All just are liberal. All ambitious are liberal. All ambitious are just.

(2.) Exemplum is an argument from particular to particular. You wish to know whether Dionysius of Syracuse is seeking to become a tyrant, you take an analogous case, Pisistratus at Athens asking for a body-guard, you *then argue*—

Pisistratus sought to become a tyrant.

Pisistratus asked for a body-guard.

All askers for a body-guard aim at tyranny.

Dionysius asks for a body-guard.

Dionysius aims at tyranny.

The conclusion here of a general rule or principle from a single instance is a case of very imperfect, or, as Aristotle calls it, rhetorical induction. The process of proof in the exemplum is up and down, from the known instance to the general rule, and thence downwards to the particular conclusion required. It, in fact, as being an argument from analogy, therefore furnishes no perfect demonstration, but a mere probability. The force of the argument depends on the parallelism between the instances adduced.

(3.) Analogy is an argument based on the resemblance of relations. We know that one thing resembles another thing in many properties, and we therefore infer by analogy that it resembles it in some other property or properties. The principle of Analogical reasoning is—"Things resembling each other in certain known respects, resemble each other in certain unknown respects."

The greater the parallelism or similarity between the cases compared, supposing that there are no causes at work to counteract or obstruct the working of those similar causes, the greater is the force of the analogical argument.

Analogical arguments vary infinitely in value; they may attain to a moral certainty, or they may not even approach to a fair presumption. When the resemblances are superficial or figurative, the analogical argument has no real force, thus—Some infer that despotic government must be good for a state, because it is good for a household. Here the points of comparison on which the conclusion depends have no resemblance, for the subjects of government in the family are children, requiring discipline, and, for the most part, unable to judge for themselves, whereas in the state the subjects are grown men, and, very possibly, equal or superior to their rulers in wisdom and knowledge.

The analogical argument is frequently used to meet and to answer objections. Butler's object in his *Analogy* is to shew that the difficulties in admitting God's moral government or the truth of the Christian religion, are paralleled by the difficulties in believing that God created the visible universe.—(See *Mill on Analogy*.)

## Chapter II

### *On Fallacies—Fallaciæ in Dictione*

A FALLACY is “any argument that violates the laws of reasoning.”

(1.) Fallacies are either in dictione, *i.e.* in form or in expression, or extra-dictionem, *i.e.* in the matter or the object of thought.

(2.) Fallaciæ in dictione are—

(1.) Fallacia æquivocationis. This is either (1) when the middle term is an equivocal term or (2) when it is undistributed.

1. All Christians are good men.

All Englishmen are Christians.

All Englishmen are good.

2. All animals are living.

Plants are living.

Plants are animals.

(2.) Fallacia amphiboliæ. This takes place when a conclusion is drawn from a proposition which is capable of more than one meaning.

Amphiboliæ or propositions with more than one meaning are, (a) The Duke still lives that Henry will

depose; ( $\beta$ ) Croesus crossing the Halys will destroy a great army.

(3.) Fallacia Compositionis is when you infer collectively what has been granted or is true only distributively. The evidence of A is not by itself satisfactory, and it is unwise to trust altogether to B.'s testimony or to C.'s or to F.'s.

The story, as it rests altogether on the testimony of these witnesses, and as we may reasonably consider the testimony of any one of them not altogether free from suspicion, may rightly be rejected.

or  $3 + 2$  are one number.

5 is  $3 + 2$ .

5 is one number.

$4 + 7$  are an equal and an unequal number.

Eleven is  $4 + 7$ .

Eleven is an equal and an unequal number.

What is no uncommon occurrence may be reasonably expected.

Winning by betting is not uncommon.

Therefore I may reasonably expect to win my bet.

(4.) Fallacia Divisionis is when that which is granted in a collective sense is inferred in a distributive sense.

All the angles of a triangle are equal to two right angles.

A B is an angle of a triangle.

A B is equal to two right angles.

*All the members of the volunteer corps are 500.*

J. B. is a member of the volunteer corps.

J. B. is 500 men.

The fallacy of division frequently arises from confounding the Universal notion with the Collective notion.

(5.) Fallacia Accentus is when in an argument a term is substituted for another term, resembling it in sound but not identical with it in sense. Many paronymous words, *i.e.* words having the same root but a different inflexion, vary greatly in meaning. A *bad* meaning is generally attached to such words as "projector, presumption, designing, theorist, designer, artful;" whereas with the words "project, theory, design, art," no *bad* meaning is associated. If therefore one were to argue that because A had formed a theory he was a theorizer, or because he had meditated a design he was a designer, or because he had a project before him that he was a projector, a conclusion unwarranted by the premisses would have been drawn.

All theorists are unsafe guides.

Harvey formed a theory about the blood.

Harvey was an unsafe guide.

To be suspected of a fraud is a presumption of guilt.

A is suspected of fraud.

We may presume that he is guilty.

(6.) Ignoratio Elenchi. Logicians require that, to refute an adversary, the elenchus or contradictory of his position should be proved. If your adversary has



proved I you should prove E, or if he has asserted O you, in order to refute him, must prove A. If for E you substituted O or I for A you commit the fallacy in question. It has, however, a wider application. An opponent commits it when he avoids the real point in dispute, and tries to turn the attention of his hearers or readers to something else which may perhaps be considered identical with it. An advocate, instead of shewing that the facts adduced are inconsistent with the guilt of his client or do not prove it, dwells on his client's past good conduct, on his persecutions, or some other matter irrelevant to the question at issue. The *ignoratio elenchi* has been so extended in its meaning as to include all those arguments where false conclusions are drawn, either from an unwillingness to see the point at issue, or from an indifference about it, or from a determination to evade it, to substitute something else for it. *Argumenta ad Hominem*, *ad Populum*, *ad Verecundiam*, *ad Ignorantiam*, are different and not uncommon forms of this fallacy. (See p. 113.)

## Chapter III

### *Fallacia extra Dictionem*

FALLACIA Accidentis. Of this there are two forms, ( $\alpha$ ) Fallacia a dicto simpliciter ad dictum secundum quid, is when the middle term is used in one premiss to signify something in a general sense, and in the other premiss is taken in connection with certain accidents, as,

What you buy at the butcher's you eat.

You buy raw meat at the butcher's.

You eat raw meat.

( $\beta$ ) Fallacia a dicto secundum quid ad dictum simpliciter, is when from the truth of a thing in a restricted or partial sense you infer that it is true in most or in all cases.

1. All the members of a state ought to have a voice in the government.

Beggars and paupers are members of the state.

Therefore they ought to have a voice in the government.

2. All persons administering poison ought to be hanged.

All doctors administer poison.

All doctors ought to be hanged.

3. Whatever intoxicates should be prohibited.

Wine intoxicates.

Wine should be prohibited.

(3.) Fallacia a non causa pro causâ is divided into the fallacy (1) a non vera pro vera, as, A comet has appeared.

Therefore there will be war.

and a non tali pro tali. This takes place whenever you argue from one thing to another when there is either no parallelism between them or the essential conditions of the one are wanting in the other. This form of the fallacy is a bad analogy.

A father should be despotical. Therefore the ruler of a state should be despotical.

States like individuals have a period of infancy, youth, and maturity. Therefore they must resemble them in having a state of decrepitude and extinction.

There may be counteracting causes in states which may keep off decrepitude and extinction, such as Christianity and civilization.

(4.) Fallacia petitionis principii is (A) when there are really only two terms, the middle term being synonymous with the major, as

Whatever is soporific causes sleep.

Opium is soporific.

Opium causes sleep.

Or (B) as when ( $\alpha$ ) in axiomatic reasoning a non axiomatic principle is assumed as axiomatic, or ( $\beta$ ) in probable reasoning a non probable principle is assumed as probable, as,

- ( $\alpha$ ) All the decisions of the Church are infallible.

The sinfulness of marriage with a deceased wife's sister is a decision of the Church.

Therefore marriage with deceased wife's sister is sinful.

- ( $\beta$ ) A shopkeeping nation will sacrifice its honour to its love of money.

Therefore the English will betray the Belgians, or

- ( $\gamma$ ) When we reason in a circle, *i.e.* when the premiss and the conclusion alternately change places, as, I know that the Scriptures are inspired because they are the Word of God, and I know that the Scriptures are the Word of God because they are inspired.

(5.) Fallacia plurium interrogationum is when two or more questions are asked as if they were one, and when one of them is answered the answer is understood as applying to all. This fallacy is very frequently employed in the cross-examination of witnesses. "Divide and conquer" is the best advice that can be given to one likely to be entrapped by it. Its fallacy can easily be met by distinguishing the questions and answering each separately. Are not the English a commercial people, a money loving people, a peace

loving people, and therefore an unwarlike people, and a people that are certain to break their word and sacrifice their honour rather than to incur the risk and expense of war ?

## Chapter IV

*On Argumenta ad Hominem—Ad Populum—Ad Verecundiam—Ad Ignorantiam*

**A**RGUMENTUM ad Hominem is when your argument is based on your opponent's admissions. Thus our Lord argues with the Jews, that it is allowable to do some acts on the Sabbath-day, for the Law commands circumcision to be performed on the Sabbath, and David's conduct shews that the positive commands of the Law may in some cases be relaxed.

Argumentum ad Populum is an argument based on principles admitted by and cherished by your audience.

Argumentum ad Verecundiam is when you shew that your adversary's position is bad because it is at variance with that of antiquity, or is *not* in conformity with the opinions of the wise or good or those deemed so.

Argumentum ad Ignorantiam is when you insist on a man's adopting your position and your opinions or beliefs because he can allege no reason to the contrary.

## Chapter V

### *On Induction*

WE always in syllogisms of the first figure reason from first principles. How are principles obtained? If we listen to Aristotle we shall say by intuition, induction, and habituation. We will not discuss whether this is a satisfactory account of the sources of our knowledge. We may maintain, without fear of contradiction, that most of the principles from which we deductively reason are obtained by Induction. Induction, as a process of discovery, is inferring the law from the facts, the investigation of the principle that explains the phenomena.

The object of the inductive philosopher is to find out the particular law which explains the particular subject submitted to his consideration. He institutes and pursues his inquiries on the well warranted conviction, a conviction based on all his past experiences and confirmed by every new one, that all things are regulated by law and order. The Science of Particular or Objective Logic furnishes him with rules or methods in making his discoveries. He ascertains the law which

explains the social or physical fact he is considering by applying, when possible, all the methods of discovery with which Inductive Logic acquaints him. Sometimes, as in chemistry, the phenomenon presents itself in so simple a form that a single instance, well and duly tested to insure correctness in the process of the inquiry, suffices as a foundation for a universal law of nature. At other times, as in Social Science, when the object is to attain an explanation of a certain social condition, absolute certainty and precision is unattainable owing to the many and complex considerations which the subject involves. Induction, however, as a process of investigation in order to arrive at material and scientific truth is not within the scope of a treatise on Formal Logic. We have only to do with the Inductive Syllogism. We may shew the inductive philosopher the principle which underlies his reasoning, but we cannot render him any real help in his pursuit after Objective Truth.

The Inductive Syllogism proves the Universal from the particulars. Its principle is—What is true of the particulars or singulars is true of the class. Its logical form is—as

A B C attract iron.

A B C are magnets.

All magnets attract iron.

A B C are wise.

A B C are honest.

All honest are wise.



The minor premiss in the Inductive Syllogism is a co-extensive proposition, and is regulated by the same law as Syllogisms composed of singular or abstract terms. The meaning of the copula in the minor premiss of an Inductive Syllogism is "equivalent to" or "identical with," the particulars being considered to equal the class. Aristotle held that Induction as a means of arriving at Objective Truth was performed per simplicem enumerationem, *i.e.* that we were warranted in drawing an universal conclusion whenever we had repeatedly and without exception observed a given attribute connected with a certain object. Thus my conclusion that a black swan was a mere fiction of the imagination would have been considered a right and true conclusion, if I, after repeatedly having seen swans, had never seen the black swan or a swan of any other colour than white. The methods of Particular Logic lead us to verify our observation by experiment, and to refrain our assent to an universal assertion till we have verified the correctness of our conclusions by ascertaining the law by which the phenomena in question are regulated. (On the subject of Induction, as a means of attaining Objective Truth, see Sir G. C. Lewis's *Methods of Reasoning in Politics*, vol. I. chap. viii, ix., x.; Mr. Fowler's *Inductive Logic*.)

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sources which have been indicated, much has been added from collections, made for the purposes of this work by the present Editor, as also from good English translations of the classical authors, and, above all, from the *Greek-English Lexicon* of **LIDDELL** and **SCOTT**, to which indeed he has so constantly referred, that, besides the check upon renderings derived through the German or French, the present volume, it is hoped, will serve as a tolerably complete Index to that invaluable work, and, in fact, may be said to be based upon it at least as much as upon the foreign lexicons which have been mentioned.

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